



<b>Academic Year (2022-23)</b>		
<b>Year: 3                      Semester: V</b>		
<b>Program: B. Tech. (Mechanical Engineering )</b>	<b>Max. Marks: 75</b>	
<b>Subject: Fundamentals of Electric vehicle</b>	<b>Time: 10: 30 am to 1:30 pm</b>	
<b>Date: 03/01/2023</b>	<b>Duration: 3 Hours</b>	
<b><u>REGULAR EXAMINATION</u></b>		

**Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.**

- (1) This question paper contains two pages.
- (2) **All Questions are Compulsory.**
- (3) All questions carry equal marks.
- (4) **Answer to each new question is to be started on a fresh page.**
- (5) **Figures in the brackets on the right indicate full marks.**
- (6) **Assume suitable data wherever required, but justify it.**
- (7) Draw the neat labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1 (a)	Describe general Layout of Electric Vehicle.	[10]
	<b>OR</b> Explain Benefits of Electric vehicle.	[10]
Q1 (b)	Explain in brief Hybrid Electric Vehicle.	[05]
Q2 (a)	Discuss various types of body and chassis for internal combustion Engine.	[10]
	<b>OR</b> Describe Steering System in internal combustion Engine.	[10]
Q2 (b)	List various types of Frame.	[05]
Q3 (a)	Explain advantages and disadvantage of Continuously Variable Transmissions.	[10]
	<b>OR</b> Describe layout, advantage and disadvantages of Automatic Transmission.	[10]
Q3 (b)	Calculate the torque capacity of multi-disc wet clutch, which has: 7 friction discs (plates), the normal force 500 N, the outer radius 0.5 m, the inner radius 0.3 m and the friction coefficient 0.04.	[05]
Q4 (a)	List and describe various resistance on vehicle while in motion.	[10]
	<b>OR</b> Describe different parameters take into consideration for vehicle performance?	[10]



Shri Vile Parle Kelavani Mandal's

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Q4 (b)	Calculate The force required to overcome air resistance for a normal family car with drag coefficient 0.33 and frontal area $2\text{m}^2$ in 90 km/h. find The rolling resistance for all four wheels in a car with total weight 1500 kg on asphalt with rolling friction coefficient 0.0272. The required engine power and torque for a car with constant speed 90 km/h with overall efficiency 0.85.	[05]
Q5 (a)	List and describe Types driver circuits of DC Motors. <b>OR</b> Explain Principle and working of induction motor.	[05] [05]
Q5 (b)	Discuss parallel Hybrid electric vehicle configuration and its power flow in different operating mode. Differentiate between configuration of Hybrid Electric Vehicle.	[05] [05]